U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

TO: Holders of Weather Service Operations Manual Series

FROM: John J. Kelly, Jr.
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SUBJECT: Transmittal Memorandum for Operations Manual Issuance 99-

1. Material Transmitted:

WSOM Chapter A-21, "NWS Configuration Management for Operational Systems," xx pages.

2. Summary:

This chapter has been substantially rewritten to reflect changes in roles and responsibilities in the configuration management of NWS operational systems. The scope of configuration management defined in this document includes only those NWS systems so authorized by the NWS Configuration Management Board.

3. Effects on Other Instructions:

Supersedes WSOM Chapter A-21, transmittal issuance 88-9, dated 10-20-88, and transmittal issuance 92-1, dated 4-24-92.

4. Action Required:

a. Remove contents from superseded WSOM Chapter A-21 binder.

b. Insert this chapter into the binder labeled WSOM Chapter A-21.

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NWS Configuration Management Board Terms of Reference

1. **Purpose**. This Weather Service Operations Manual (WSOM) Chapter establishes policy, authority, and responsibilities for the Configuration Management (CM) of National Weather Service (NWS) systems. In this document, an NWS system is defined as the integrated physical and logical elements, including facility, hardware, software, communications, and documentation, that meet or define a set of functional specifications based on established service requirements related to the collection, processing, and/or dissemination of hydrometeorological information and service products. A configuration base line is defined as the functional and physical identification from which change control can be established.

2. **Overview**. The Assistant Administrator for Weather Services established a formal CM organization in 1983 with the formation of the NWS Configuration Management Board (CMB). This organization manages an NWS CM process that assures:

(1) Requirements are validated and approved.
(2) Requirements drive end-item definition.
(3) Functional and physical base lines fully conform to approved requirements.
(4) Authorized strategic, science, and technology improvements are readily accommodated.
(5) All approved and released changes, along with their associated documentation, are properly managed.

It accomplishes this by means of a formal CM process. Upon establishment of a configuration baseline, formal change control is mandated for the submission, review, decision, notification, and implementation of approved changes to controlled systems of the NWS. Change reviews validate the requirement; consider alternative solutions; and, identify the net effect of the change on established and controlled baselines, maintenance and logistics support, costs, schedules, performance, and interface with other systems.

Routine changes, and technical reviews and change recommendations for more significant changes, are managed by Configuration Control Boards (CCBs) commissioned by the NWS CMB. CCBs are comprised of technical and mid-management focal points who represent the various resource allocation, management, requirements, policy, and oversight leadership of the NWS. Where interagency agreements dictate, major program changes, after they have been staffed by the CCBs, are presented to multiagency Program Management Committees (PMCs), comprised of senior executive level managers, for executive business decision. Boards or committees commissioned by the NWS CMB will be decommissioned upon completion of their appointed tasks.

Approved change implementation directives establish the change requirement and priority, define physical item and document impact, and drive hardware and software implementation and schedules. Planned change completion schedules and resource requirements are tracked and reported in routine bi-monthly program reviews. Once the change is fully developed, it is turned over for formal testing at an established test facility; and subsequently, for

operations, test, and evaluation at field test sites. These formal tests assure the changes comply with the approved requirements and that documentation fully supports all aspects of the modification. PMCs approve the release of major changes to the field. All change releases are announced with official change notices, engineering modification notes, or software release notes which provide the installation detail. Change implementation is routinely audited at representative sites.

This is a repeatable, consistent conformance process with predictable results. Internal NWS resources are driven by validated requirements, subordinate end-item definition, and physical item change. This process is tightly managed and leads to continuous improvement in NWS products and services.

3. Responsibilities. The major NWS CM functions are executed by the Assistant Administrator for Weather Services; NWS CMB; Director, Office of Operational Systems (OOS) **[currently Office of Systems Operations;]** Systems Change Manager; Systems Configuration Manager; Office and Regional Directors; and Office and Regional CM focal points. The Director, OOS is responsible for (a) the design, implementation, and management of the procedures which implement the policy, and (b) preparation and coordination of any revisions to this document.

3.1. Assistant Administrator for Weather Services. The Assistant Administrator for Weather Services is the ultimate approval authority for:
(1) the establishment of any changes to this CM policy and procedure, and
(2) changes that have a major impact on service requirements, the NWS organization, NWS budget, previously approved program schedules, and those changes that cannot be resolved by the NWS CMB.

3.2. NWS Configuration Management Board. The CMB has been established by the Assistant Administrator for Weather Services and delegated the authority to govern the NWS CM program. To provide maximum breadth of responsibility and authority, the CMB comprises the NWS Headquarters Office Directors and the NWS Regional Directors and reports to the Assistant Administrator for Weather Services. The Director, OOS, chairs the CMB and the Systems Change Manager serves as the Executive Secretariat.

The CMB:
(1) Authorizes the inclusion of an NWS system under the provisions of the NWS CM process.
(2) Establishes specialized management mechanisms for handling recurring CM tasks or functions (e.g., administrative management and review groups).
(3) Reviews CM activities, at its discretion, and redirects activities, if appropriate.
(4) Allocates existing office and regional resources (staff, funds, and facilities) necessary to accomplish all tasks assigned by the CMB.
(5) Defines and clarifies CM roles and responsibilities within the NWS.
(6) Reviews and acts upon Requests for Change that cannot be resolved by the appropriate lower board/committee.

(7) Recommends options for any changes that significantly affect service requirements, NWS organization, budget, or a previously approved program schedule to the Assistant Administrator for Weather Services.
(8) Refers decisions on Requests for Change which the CMB cannot resolve to the Assistant Administrator for Weather Services.
(9) Designates representatives to serve as formal CM focal points throughout the NWS.

A charter governing the activities of the NWS CMB shall be maintained and is presented as an attachment. Special CM review and decision boards and committees may be established by the NWS CMB to provide an orderly, logical, and expeditious review and processing of categories of Requests for Change where specific program or technical expertise is required. These groups shall be comprised of representatives who provide maximum breadth of responsibility and depth of technical expertise and shall be directed by a group chair. All such boards and committees shall have an operating charter approved by the NWS CMB.

When joint Federal agency programs require the formation of CM boards or committees, the makeup of such groups will be evenly proportioned among the agencies and generally not exceed one regular member per agency. The establishment of these interagency boards or committees will be approved in the NWS by the Assistant Administrator for Weather Services. The NWS Member of such board/committee shall refer unresolved multiple-agency matters to the NWS CMB Chair for guidance.

3.3. **Director, Office of Operational Systems**. The Assistant Administrator for Weather Services has delegated authority to the Director, OOS (W/OOS) to serve as the Chair of the NWS CMB.

3.4. **Systems Change Manager**. The CMB has delegated authority to the Systems Change Manager for developing, coordinating, and managing NWS policy and procedure for NWS CM of operational systems. The Systems Change Manager also will act as the CMB's agent, across organizational lines, for the general management and resolution of all proposed changes to specified NWS systems. The Systems Change Manager will work in close cooperation with each specific system Program Manager to meet unique program goals and objectives. The Systems Change Manager is organizationally in the Office of Services (W/OSx3).

The Systems Change Manager:
(1) Incorporates new systems under the formal CM process.
(2) Coordinates and tracks change implementation.
(3) Coordinates validation of new and existing requirements.
(4) Coordinates special analyses of planned modifications to existing systems.
(5) Coordinates review of proposed change to determine its effect on hardware, software, communications, and procedures; the significance of the resources required; the areas of technical expertise required; and interactions with other systems.

(6) Coordinates the design of alternative approaches to satisfy requirements stated in the change proposal. Provides rationale and decision parameters to enable evaluators to select the best approach.
(7) Coordinates the cost information for each of the alternatives.
(8) Coordinates tests with test directors to evaluate the selected approach.
(9) Coordinates the performance measurements for the test with the test directors and the field, central test sites, and other affected systems managers. Ensures the test results are provided in a written test report that is incorporated into the documentation supporting the change.
(10) Audits new development and the integration of changes into existing systems to ensure they comply with approved documented requirements.
(11) Performs secretariat functions for the CMB, CCBs, and PMCs, including scheduling meetings, preparing the agenda and supporting information, assisting the chair in the conduct of meetings, and preparing and distributing meeting minutes.
(12) Prepares change proposals for decision disposition by the appropriate authority; defines specific implementation status information; coordinates change notices; maintains the change status tracking information, and verifies completion of the approved changes.
(13) Provides limited administrative support to special working groups authorized by the CMB, PMCs, or CCBs.

3.5. **System Configuration Manager.** The CMB has delegated the authority for developing and managing processes for configuration identification, configuration baseline modification, and configuration validation to the Systems Configuration Manager. The Systems Configuration Manager is organizationally in OOS (W/OOS). Configuration management principles will be applied to NWS systems under formal CM in coordination with the specific system Program Manager and CM authority.

The Systems Configuration Manager:
(1) Applies consistent and systematic methods to the identification of facilities, hardware, software, firmware, and communications services, and the identification of baselines, as well as documents, drawings, and data lists that support and define precise system baselines.
(2) Provides configuration management guidance to Program Managers, Contracting Officers, and Engineering and Logistics Managers.
(3) Designs and maintains an integrated configuration management information system containing configuration identification, baseline, site, and authorization document information.
(4) Issues configuration identification numbers for items under a standard controlled process.
(5) Receives, itemizes, processes, and maintains configuration item transactions (deliverables, sparing, approved changes, and engineering modifications) in the configuration management information system data bases.
(6) Maintains appropriate data files within the configuration management information system data base that records data on parts lists,

specifications, engineering change proposals, specification control drawings, data lists, and other technical procedures or manuals.

(7) Compiles and publishes configuration reports, including baseline reports, to the format and schedule agreed to with the Systems Change Manager, CMB, National Oceanic and Atmospheric Administration, General Services Administration, or system contractors.

(8) Initiates periodic validations of configuration baseline items at system sites to maintain the quality of the baseline data base and the definitive facility design manual of each site.

3.6. **Office Directors and Office CM Focal Points**. The Office Directors shall serve as members of the NWS CMB and appoint CM focal points within their respective offices to serve as the working level CM contact point for their office. The CM focal point serves as the office focal point for all CM matters and shall be responsible for the coordination and tracking of proposed changes received from the Systems Change Manager for office review. The CM focal point shall be responsible for submitting the coordinated recommendation of the office for each proposed change to the Systems Change Manager. The CM focal point is vital to the successful performance of the change management process. The CM focal point shall be responsible for office adherence to CM policy and procedure.

3.7. **Regional Directors**. The Regional Directors shall serve as members of the CMB and have designated the Systems Operations Division Chiefs within their respective regional headquarters to serve as the CM contact point for their regional headquarters. The Regional Directors also have delegated authority to the Regional Systems Operations Division Chiefs to establish regional CM policy and procedure.

3.8. **Systems Operations Division (SOD) Chiefs**. The Regional SOD Chiefs establish regional CM policy and procedure and are delegated regional responsibility and authority for system operations and support activities. The SOD Chiefs serve as the overall regional focal points for CM matters and shall be responsible for the coordination and tracking of proposed changes. The SOD Chiefs shall be responsible for submitting the coordinated recommendation of their regions for each proposed change. The SOD Chiefs are key elements in the interface between national Headquarters and the regions and are vital to the successful performance of the change management process. The SOD Chiefs shall be responsible for regional adherence to national CM policy and procedure. The SOD Chiefs may designate working level CM contact points within their regions for specific systems.

3.9. **Field Offices**. The field office Meteorologists or Hydrologists in Charge (MICs or HICs) establish local CM policy and procedure and are responsible for the initial review and transmittal of all local office proposed changes to its regional headquarters. The MICs or HICs are responsible for the field office's adherence to regional and national CM policy and procedure.

3.10. **National Centers for Environmental Prediction (NCEP) Centers**. The Center Directors establish local CM policy and procedure and are responsible for the initial review and transmittal of all local office proposed changes to the National Centers for Environmental Prediction. The Center Directors are responsible for the center's adherence to regional (when applicable) and national CM policy and procedure.

4. **Change Control**. Changes to NWS systems are expected to meet mission needs, fulfill technical requirements, correct deficiencies, improve products, reduce cost, or provide advantages to the Government. Formal change control includes a systematic proposal, justification, evaluation, decision, scheduling, coordination, implementation, and follow-up audit of approved change. Change authority levels will be established for each system such that change control responsibility is exercised at the lowest possible level. Details of the change control process can be found in the NWS CM Procedures Handbook.

5. **Operations Problem Tracking** An operations problem tracking process shall interface with the predominant change control process. Problem tracking is focused on identifying and collecting details on exceptions and discrepancies in operations performance and base line. Operations hardware and software problems for the major NWS systems will be reported to a single center for system trouble reporting. For other systems, the system Program Manager will define the contact point and process for reporting problems. If unresolved by the center's or Program Manager’s immediate corrective action, the problem will be entered into an automated tracking system and assigned for resolution. This resolution may result in a change proposal initiation.

6. **Software Configuration Management**. National software CM will be managed by the specific system’s program developers. Software builds advanced to production implementation status will also be provided to the Systems Configuration Manager for production baseline release tracking.

During the development phase of the software life cycle, configuration control is provided by released performance, design, and interface documentation. The documentation requires change approval and release authority.

For national operational software releases, configuration control demands a rigorous unit, integration, and operations environment testing, documentation, training, quality assurance certification, final approval, and formal release notification observance. Implementation is planned in a logical, orderly manner with known and acceptable impacts to the user environment.

For specific NWS systems, CM may include the extensive identification and control of geographical points or maps, site identifiers, adaptable parameters, or local adaptation data.

6.1. **Applications Software**. The NWS encourages the development of applications programs for meteorological and hydrological use at the local,

regional, and national levels. To provide satisfactory CM, applications programs at a local level are managed and controlled by the MIC and/or HIC at the specific field office. Applications proposed for wider use at the regional level are formally submitted to the regional office for decision action. Those applications programs considered for national use and inclusion in base line software must be formally submitted by the regional office to the Systems Change Manager. The Office of Science and Technology (currently OSD) will manage an information library that describes and tracks applications used at field offices, regions, or nationally. The impacts of major system releases on these applications shall be considered in the change management process. [Reference - AWIPS Local Application Management Plan, Version 2.0, dated September 22, 1999]

7. **Hardware Configuration Management**. Hardware CM is tailored to the specific hardware system description which is usually defined in a system specification or document tree. The level of detail provided will explicitly convey the relationships of the various specifications and other documents that define a system. The decomposition of systems into subsystems and then into Configuration Items (CIs) provides a common parts list of controlled items. Two Integrated Logistics Support (ILS) activities affect the identification of these CIs or parts. These are the traceable items and the associated definitions of Line Replaceable Units (LRUs). Specific subsystems may be decomposed into a number of LRUs that are assigned unique serial numbers to permit unique identification of each LRU as it flows through the logistics system. These items are often repairable items that are repaired at the National Reconditioning Center (NRC) or sent by NRC to a private vendor facility for repair.

As changes occur in this era of rapid technology change, original parts and subassemblies may no longer be repairable or even manufactured. Interchangeability (approved substitute or replacement parts) must be integrated into the affected system even as support is continued for original equipment. The CM process provides for the uniform identification of all original, substitute, and replacement parts and their control.

For specific NWS systems, hardware CM may include identification and control of embedded firmware, system interfaces, and communication items.

8. **Facility Management**. Facility Management CM is tailored to meet the operations needs of the local office and regional or national objectives when planning and implementing approved system change modification. For CM purposes, facility management focuses on maintaining a current level of facility drawings to expedite the review, decision, and implementation of approved technologies which may influence the footprint of equipment in the facility, or power, heating, ventilation, and air condition needs. At the local level, a change may result as a matter of simple ergonomics. If uncoordinated, or un-communicated, locally approved changes could compromise cost effective regional or national CM initiatives. Thus, the local office must be able to obtain and easily update facility drawings that are maintained

in the OOS Technical Reference Library (TRL). Likewise, implementation planners must be able to reserve floor space, cabinet space, electrical power, etc., for technology evolution and approved change. Tools, such as AutoCAD, that maintain facility level drawings, including system floor plans, will be employed to expedite these processes.

9. **Interface Management.** Interface Management CM is tailored to the functional and physical characteristics required to exist at a common boundary. All direct interfaces to commissioned, operational NWS systems under the NWS CM discipline must be controlled to minimize the risk of intentional and unintentional data corruption or loss of system resources. Interface management requires a formal certification of compliance for the interface, an approval by the appropriate authority level, an Interface Control Document describing the interface, and coordination for the interface with the local point of contact.

10. **Communication Data Product Management**. Data Product CM is tailored to the data exchange path and directory supporting a product's dissemination and receipt. Thus data products exchanged by a local office to its local user constituency is managed and controlled by the MIC and/or HIC at the specific field office. If these data products are proposed for transmission over regional networks, a formal proposal is submitted to the regional SOD CM process for decision action. Those data products considered for transmission over national communication networks must be formally submitted by the regional SOD to the Systems Change Manager. Data product configuration management always includes product headers and communication priority and may include extensive data product items including communication identifier, origination, destination, size, frequency, format, and issuance time.

11. **Documentation Management**. Documentation CM is tailored to the respective system and may include specifications, drawings, parts lists, site configuration data, artwork, wiring lists, and software version description. The purpose of this documentation is to operationally and logistically support engineering decisions and provide an accurate definition of the system baseline. The TRL is the official repository for the system baseline documentation.

12. **Quality Assurance**. Configuration management for the NWS will include the responsibility for obtaining test documentation (plans and results) and inspecting change. These change inspections by the Systems Change Manager must guarantee that product performance meets the stated requirement. Problems detected in tests and inspections will be reported and tracked through resolution. Low risk work-arounds may be authorized as temporary fixes. These problems will be uniquely identified, analyzed, classified, and reported to Program Managers and/or focal points so as to identify trends. For each NWS system, change will be examined for its impact on other systems.

13. **NWS CM Procedures Handbook**. The NWS CM Procedures Handbook

[currently in draft] further identifies CM and related activities, required resources, NWS focal points, responsibilities, detailed processes, and a list of sources for other documentation describing processes necessary to carry out CM and associated activities.

ATTACHMENT

NWS CONFIGURATION MANAGEMENT BOARD

TERMS OF REFERENCE

Revised December 7, 1999

A. Purpose

The purpose of the National Weather Service (NWS) Configuration Management Board (CMB) is to organize and manage the development and operation of a configuration management program for the NWS. This program assures:

1. Requirements are validated and approved.
2. Requirements drive end-item definition.
3. Functional and physical base lines fully conform to approved requirements.
4. Authorized strategic, science, and technology improvements are readily accommodated.
5. All approved and released changes, along with their associated documentation, are properly managed.

B. Composition

The members of the CMB are the Directors of the NWS Office of Chief Financial Officer/Chief Administrative Officer, Chief Information Officer, Office of Services, Office of Science and Technology, Office of Hydrologic Development, Office of Operational Systems, National Centers for Environmental Prediction, and the Directors of all NWS regions. The Chair is the Director, Office of Systems Operations [Office of Services].

C. Functions

The CMB:

1. Identifies all major tasks that are essential to effective management of NWS changes and clarifies the responsibility and authority within the NWS for these tasks.

2. Establishes specialized management mechanisms necessary to accomplish recurring tasks or functions, including NWS configuration management.

3. Serves as the governing body for NWS configuration control.

4. Allocates office resources (staff, funds, and facilities) necessary to accomplish all tasks assigned by the CMB or, if required resources are

unavailable, requests and justifies additional resources.

5. Documents and reports all major decisions and their rationale.

6. Recommends options for any change that has a significant effect on service requirements, the NWS organization, NWS budget, or previously approved NWS schedule to the Assistant Administrator for Weather Services.

7. Refers any major issues that cannot be resolved by the CMB to the Assistant Administrator for Weather Services.

D. Operating Rules and Procedures

The CMB shall operate under the following rules and procedures:

1. Members are expected to participate personally and normally shall not designate an alternate to represent them at meetings. If this should be necessary, the alternate shall be delegated full authority.

2. The CMB shall operate on the basis of consensus; any member can insist on the resolution of an issue by the Assistant Administrator for Weather Services. The Chair shall obtain the resolution.

3. Meetings of the CMB shall be announced at least 2 weeks in advance, longer if possible, and an agenda and brief summary of major issues to be decided or discussed shall be provided at that time.

4. The Chair, in consultation with members of the CMB, shall invite other persons to participate in each CMB meeting as is necessary to facilitate the work planned for that session.

5. The CMB shall identify any continuing staff roles needed to support its work and shall designate appropriate persons from within their offices to carry out these roles.

6. Written summaries of major decisions shall be submitted to members for approval before further distribution, normally within 1 week after the meeting unless the CMB allocates a longer period to allow time for required staff work. Decisions shall go into effect, with necessary corrections or clarifications, 1 week after such submissions for final approval.